DOCUMENT RESUME

ED 364 273 JC 930 539

AUTHOR Alonzo, Adam
TITLE Planning for Educational Technology: A Survey of Sinclair Community College Faculty.
PUB DATE Dec 93
NOTE 80p.; M.S.Ed. Master's Project, University of Dayton.
PUB TYPE Dissertations/Theses - Masters Theses (042) -- Tests/Evaluation Instruments (160)

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS *College Faculty; College Planning; Community Colleges; Comparative Analysis; *Computer Uses in Education; *Educational Technology; Microcomputers; School Surveys; *Teacher Attitudes; Teacher Characteristics; Technological Advancement; *Technological Literacy; Two Year Colleges
IDENTIFIERS Sinclair Community College OH

ABSTRACT

In June 1993, all 274 full-time faculty members at Sinclair Community College (SCC), in Ohio were surveyed concerning their experiences, opinions, and desires regarding educational technology. Specifically, the study sought to determine faculty experience with educational technologies; establish the level of training faculty had received and their desires for additional training; assess the ways in which educational technology is being used at SCC; and identify obstacles to the implementation of educational technology. Study findings, based on a 64% response rate, included the following: (1) 77% of the instructors reported having computers at home, 62% in the office, and 62% in classrooms or labs; (2) among faculty with computers at home, 82% reported having IBM computers or IBM-compatibles; (3) 85% reported being "self-taught on the job" with computers; (4) 67% reported interest in training for "techniques for curriculum integration of technology"; (5) 87% reported most frequently using computers (in personal or administrative tasks) for "document creation"; (6) among discipline areas, engineering faculty most frequently used computers for teaching tasks; (7) 46% of the faculty cited "lack of time" as the chief obstacle to implementing educational technology; and (8) only 44% said they were aware of a plan for educational technology at SCC. Comparisons of results by academic discipline, data tables, 16 references, and the survey instrument are included. (PAA)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 364 273

PLANNING FOR EDUCATIONAL TECHNOLOGY:
A SURVEY OF SINCLAIR COMMUNITY COLLEGE FACULTY

MASTER'S PROJECT

Submitted to the School of Education
University of Dayton, in Partial Fulfillment
of the Requirements for the Degree
Master of Science in Education

by

Adam Alonzo
School of Education
UNIVERSITY OF DAYTON
Dayton, Ohio

December 1993

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

A. Alonzo

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

BEST COPY AVAILABLE

JC 930 539

ALONZO, ADAM G.

PLANNING FOR EDUCATIONAL TECHNOLOGY: A SURVEY OF SINCLAIR COMMUNITY COLLEGE FACULTY (79 pp.), December 1993

Faculty Advisor: James Biddle, Ph. D.

PROBLEM. Colleges face increasingly complex options as educational technology becomes more advanced and widespread. Administrators and planners must develop technology strategies which are based upon solid research and which take the needs and desires of the faculty into account. It is only when all levels of the institution are involved that technology initiatives can succeed.

The purpose of this project was to provide Sinclair Community College administrators and planning bodies with current information about the experiences, opinions and desires of faculty in regard to technology. This information can then be used by the College to plan its technology strategy.

PROCEDURE. A faculty technology survey was developed based upon similar studies done elsewhere and the recommendations of the Sinclair community. This questionnaire was distributed to all full-time professors at the College. Results were compiled into reports which revealed the faculty's experience with technology, their training experience and needs, how they are currently applying technology at Sinclair, and the obstacles which hinder them from technology implementation.

FINDINGS. Faculty have a variety of experiences with technology, though access continues to be a problem. Instructors desire more technology training, and expressed a great interest in Sinclair-sponsored training on campus. Faculty use computers for office tasks more than they do for direct instruction, and the computer applications they develop frequently do not take advantage of the technology's unique capabilities. Instructors in the quantitative disciplines tend to use technology more than their counterparts. Most faculty surveyed reported that their efforts were not guided by an institutional, departmental or personal technology plan.

CONCLUSIONS AND/OR RECOMMENDATIONS: The College should continue to provide training opportunities for faculty at all skill levels. Efforts should be made to transfer instructors' office computer skills to the classroom. The statements of the faculty regarding the obstacles to technology use can be used as guidelines to encourage implementation. Finally, administrators, deans and department heads should work with their faculty to develop unified technology plans which everyone can pursue.

TABLE OF CONTENTS

List of Tables 4

Acknowledgements 6

Chapter I - Introduction 7

Chapter 2 - Literature Review 12

Chapter 3 - Methodology 17

Chapter 4 - Results 22

Chapter 5 - Conclusions and Recommendations 65

Appendix A - References 71

Appendix B - Faculty Technology Survey 74

LIST OF TABLES

Table	Description	Page
1	Sinclair faculty grouped by discipline	20
2	Access to computers at home (by discipline)	23
3	Access to computers in office (by discipline)	24
4	Access to computers in classroom or lab (by discipline)	25
5	Type of computer at home	26
6	Type of computer in office	27
7	Type of computer in classroom or lab	28
8	Computers used in any setting	29
9	Multiple computers used	30
10	Muitiple computers used (by discipline)	31
11	Type of computer preferred	32
12	Comfort level with technology (by discipline)	34
13	Learning new technologies (by discipline)	35
14	Technology training received	36
15	Multiple sources of training	37
16	Multiple sources of training (by discipline)	39
17	Interest in types of training	40
18	Interest in multiple types of training	42
19	Personal or administrative computer tasks	45
20	Multiple personal or administrative computer tasks	46

LIST OF TABLES (CONTINUED)

Table	Description	Page
21	Multiple personal or administrative computer tasks (by discipline)	47
22	Instructional or classroom computer tasks	48
23	Multiple instructional or classroom computer tasks	49
24	Multiple instructional or classroom computer tasks (by discipline)	50
25	Use of traditional media in the classroom	51
26	Traditional media used "Very often" (by discipline)	53
27	Media developed for courses	54
28	Computer applications developed	55
29	Multiple types of media developed	56
30	Multiple types of media developed (by discipline)	57
31	Obstacles to technology implementation	59
32	Awareness of an institutional technology plan (by discipline)	61
33	Awareness of a departmental technology plan (by discipline)	62
34	Existence of a personal technology plan (by discipline)	63
35	Support for technology implementation (by discipline)	64

ACKNOWLEDGEMENTS

The student wishes to thank three members of the University of Dayton's School of Education for advice and support: Dr. James Biddle, Judy Oberlander, and Dr. Herman Torge.

In addition, the student is grateful for assistance provided by a number of the adminstrators, staff and faculty at Sinclair Community College: Doug Easterling, Peggy Falkenstein, John Graham, Susan L'Heureux, Dr. Katy Neff, Linda PaHud, Joan Patten, Dr. Cindra Phillips, Bill Smith, Dr. Karen Wells, Dr. Eleanor Young, and Lori Zakel.

Finally, the student is indebted to the many instructors at Sinclair who took the time to complete the Faculty Technology Survey, upon which this Project is based.

CHAPTER I

INTRODUCTION

Problem Statement

Technological innovation is occurring at an ever increasing rate, promising to bring more powerful systems, increased speed, widespread proliferation and simpler operation (Nickerson, 2). These and other developments have great potential to influence and even transform education. "Into the next millennium, rapid advances in information technology will be the most important trend shaping education" (Dede, 8).

Educational systems at all levels and in all locations are presently developing strategies that will utilize technology to enhance instruction (Bailey, 1; College of DuPage, 6; Kent and Linnegar, 81; McAllister, 6; Rogers and Hawkins, 375; Steinhaus, 2). This involves more than just choosing equipment and installing it in labs and classrooms. It is a thoughtful process beginning at the curricular level. There is no doubt that technology will improve and schools will continue to purchase it. "The question now is not whether technology will end up in schools, but how to integrate it with teaching and learning" (Olson, 20). This design stage is necessary in order for schools to determine their instructional needs, examine the numerous options available and create a technology strategy. Planners must rely upon information which is available today as they seek to plan for tomorrow, because implementing a technology strategy is a

lengthy process. "Building a curricular architecture and retraining teachers to take full advantage of emerging technologies . . . will require years of development in advance" (Dede, 9).

Need for the Study

Unfortunately, sometimes educational planning bodies undertake their task lacking two important elements: research and faculty involvement. Although "research has a significant effect" on technology program effectiveness, in practice only 11% of colleges and universities actually conducted research in the planning stage (Washington, 15). "Lacking solid research . . . schools and teachers are exploring uses of technology on their own . . . often with no clear direction" (Olson, 20). The most effective planning groups, however, make research an integral part of their duties. For instance, one system developed a study involving over 750 schools "to provide information to the New Mexico Educational Technology Planning Committee (ETPC). Empirical evidence (was) needed by the ETPC in order to formulate a statewide plan for technology in education" (Steinhaus, 2). With an accurate base of knowledge gathered through research, planners will be better prepared to make important decisions with long term effects.

When planning to implement new instructional strategies utilizing educational technology, administrators ought to be aware of the needs of the faculty, who will be the ultimate users of the technology. Successful achievement of technology goals demands a commitment at all levels of

the institution. This means involving teachers in the planning stage prior to implementation, gathering their opinions and seeking their recommendations. "Faculty involvement is essential for the identification and evaluation of instructional applications" (College of DuPage, 24). Instructors must see new technology as being necessary and beneficial to them, or else the innovative effort risks failure. "The literature clearly illustrates the importance of utilizing technology to improve instruction . . . but it suggest the fate of computers in schools will depend upon their efficiency and effectiveness as perceived by teachers" (Washington, 18). In institutions where faculty and administrators are not following a common plan for technological implementation, the inherent difficulties attached to technology (such as funding and curriculum integration) might be worsened by organizational conflict (Hammond, 162). But if the goals of technology integration are shared by all levels of educators, the likelihood of success is more favorable. "The findings suggest that decisions about computer hardware and software that are broadly supported are likely to result in computer program effectiveness" (Washington, 21).

Purpose of the Study

This project is designed to avoid both of these potential planning weaknesses by researching the faculty's perspective regarding educational technology. A survey of instructors at Sinclair Community College was conducted to determine their experiences with, opinions toward and requirements of educational technology. This information will

then be provided to the administrative bodies which are making decisions about the role of technology in Sinclair's future.

The Student's Interest

The student works as a media provider at Sinclair, and is concerned that the College plans its direction and spends its resources wisely. He has witnessed how one type of technology was implemented without the involvement of the faculty, and how that costly system now sits idle. It did not meet the needs of instructors, was beyond the realm of their experience, and no effort was made to orient them toward it. As a result, the faculty passively or actively resisted its use and the innovation has not succeeded. Now that Sinclair is again developing new technology programs, the student would like to keep planners informed about faculty needs, so that the programs might be successfully adopted by teachers.

Scope of the Project

The significance of this study is confined to Sinclair Community College, although insights can be generalized by other educational institutions facing similar questions.

Objectives to be Met

This project had several objectives, which can be grouped into two categories. The first group deals with the information to be gathered from the Sinclair faculty. This project sought to:

- Determine the faculty's experience with computers and other educational technologies
- Establish the level of training Sinclair faculty have received in educational technology and their desire for additional training
- Find out how educational technology is being applied in curriculum and other areas of the College
- Discover the obstacles that faculty feel hinder their implementation of educational technology

The second group of objectives concern the intended benefit this study will have for the College as it plans its future. These objectives include:

- Demonstrate how planning in education ought to involve both administrators and faculty
- Provide the administration with a profile of the faculty's efforts to implement educational technology
- Develop recommendations for the enhancement of technology implementation which administrators can consider

Definitions

To assist readers in understanding the concepts relevant to this study, the following terms ought to be defined:

Educational technology is a broad term which refers to various media that support instruction. This includes both equipment (hardware) and materials (software or courseware).

Technology implementation is the goal of educational technology efforts. It is the application of technology to education in a vital, rather than a secondary, way. It enables teachers to use technology to accomplish instructional tasks which were previously impossible.

Assumptions

In undertaking this project, the student makes some basic assumptions. One primary assumption is that the sample of faculty surveyed will provide responses that are representative of the entire teaching staff. This will allow the Sinclair administration to make a meaningful analysis of the results and lead to appropriate decisions.

CHAPTER II

LITERATURE REVIEW

When undertaking a research project of this nature, it is useful to simultaneously survey the educational literature to look for studies which

pursued similar objectives. With this information as background, the student will be able to evaluate how Sinclair's educational technology status compares to other institutions.

Training

One of the key objectives of this project was to determine the level of training faculty have received on educational technology. This information is sought because of the importance that teacher training has for the success of a technology program. In fact, according to some studies, it is the most important factor (Bailey, 4; Janowiak, 31; "Teachers Speak," 71). "Faculty with training and experience in computer use are more likely to bring the technology into their instruction" (Greene, 40). However, only one quarter of respondents in one analysis had taken a computer course as an undergraduate ("Teachers Speak," 71).

Colleges today must not rely on their faculty's formal education in the area of technology because "the new technologies were unavailable when most teachers and administrators received their pre-service education. Therefore, continuous training is important" (Steinhaus, 20). Institutions must either create their own inservice training for faculty, or enable teachers to receive that instruction elsewhere. When considering staff development programs, administrators should be aware that the most positive aspects of training, according to teachers in one study, were hands-on experience and uninterrupted free time to get comfortable with the technology ("Teachers Speak," 71). As far as the approach is

concerned, most faculty at one community college preferred to participate in local workshops (91%), followed by release time training (81%), formal courses (76%) and regional meetings (74%) (Seppanen, 2).

A significant finding of one study was a "critical threshold" of how much training was required before an impact was detected in instructional technique. "The propensity (to use technology in class) differs very little for those with *no* training or use and those with *only one* type of training or usage" (Greene, 40-41). The conclusion was that faculty ought to receive both formal training and informal workshops to increase their exposure and the likelihood that they will then employ technology in their lessons.

Applications

Another goal of the present study was to discover what technologies Sinclair instructors are using now. This includes both the media employed and the curriculum area. One national survey sought to determine which technology tools were most frequently used by teachers and reported that "microcomputers were rated most highly, followed by overhead projectors, video cassette recorders and courseware" (Janowiak, 6). In terms of subject area, it is demonstrated in several studies that technology, especially computer technology, is used most frequently in objective, mechanical and numerical courses. "The faculty with the strongest incentive to understand and use computers have been those whose subject area (and training) is 'quantitative' in nature" (Greene, 38). It is a positive fact that 90% of college faculty who teach such

quantitative subjects involve computers in their courses (Greene, 39), but it is unfortunate that instructors in other fields are far behind. In one study, physical education, arts and language teachers were least likely to employ any type of technology in instruction (Janowiak, 25). This disparity is possibly due to the skills of the teachers themselves. A survey of one college's teaching staff revealed that "only twenty percent of the humanities faculty surveyed were computer-literate, while forty-eight percent of the math/science faculty surveyed were found to be computer-literate" (McAllister, 65).

Obstacles

Discovering potential obstacles to the use of educational technology was another objective of this project. A number of similar studies have established that the three main obstacles are the lack of funds, the lack of time to learn and utilize media, and the lack of training (Bailey, 5; Bruder, 27; Kent, 89; Janowiak, 31-32; Seppanen, 8). Other findings include the lack of assistance or encouragement from departments and administrators (Hammond, 155), the lack of software compatible with curricular goals (Olson, 21) and the lack of technical assistance when troubleshooting is needed (McAllister, 39).

Recommendations

Finally, this survey was distributed to Sinclair faculty to elicit recommendations from them on how to eliminate these obstacles and

enhance the use of educational technology on campus. As discussed earlier, more and better training is often cited as the most important strategy ("Teachers Speak," 71). In addition, faculty also suggest making more equipment available, providing more technology trainers and mentors, and creating users groups to encourage integration (McAllister, 60-61). Beyond these recommendations, there are also important organizational methods suggested which could encourage technology exploration by faculty. One example of this is financial incentive. "It is clear that few institutions explicitly reward teaching innovation" (Hammond, 159). One study concluded that "incentives need to be provided which will encourage them to take an active role in (instructional applications)" (College of DuPage, 24). These rewards include release time, summer pay, royalties, research funding and peer recognition. A second organizational strategy to encourage technology use involves making it a priority within the administration. One survey reported that "few lecturers perceived any pressure from their department or institution to introduce innovative approaches to their courses" (Hammond, 159). It is important for administrators to remain abreast of technological advances in education, and spearhead the creation of a technology-rich curriculum "by funding a critical mass of researchers and teachers to design and develop high-risk instructional applications based on emerging technologies" (Dede, 9).

By reviewing existing literature pertaining to the educational use of technology, it should become clear how useful this project will be to discover important issues at Sinclair Community College. By determining their training experience, it will help in assessing needs and designing future inservice programs. By learning about their current use of technology, the College will discover which areas need attention. Documenting their results will justify further investment in technology programs and might encourage other instructors to become involved. And by listening to faculty describe obstacles to innovation and their recommended strategies to eliminate them, administrators will possess knowledge vital to the development of a technology plan.

CHAPTER III

METHODOLOGY

This project was planned during the spring of 1993 when the student enrolled in EDT 503 Educational Research Methodology. He developed a plan to conduct a descriptive research study to determine the current uses of educational technology by Sinclair Community College faculty, in order to better support and build upon their efforts. The student produced a proposal which was approved by the class instructor.

Questionnaire Design

Meanwhile the student consulted certain administrators and planning committees at Sinclair in an effort to make sure the information sought by the study would be relevant to their objectives. A draft of the questionnaire was distributed to the project advisor and to an informal advisor at the University, as well as to several selected faculty and staff at the College. Their comments and suggestions were incorporated into the final draft of the survey instrument.

The questionnaire has several sections which correspond to the various objectives of inquiry stated previously:

- Faculty experience with educational technology
- Training received and desired by faculty
- Current applications at Sinclair
- Obstacles to implementation of educational technology

Research Sample

Sinclair's Vice President for Instruction provided a list of the faculty, and from that list the student selected all professors, associate professors and assistant professors as the targets of the study. In the first week of June 1993, 274 surveys were distributed to the faculty. Nearly 50% of them were returned within the next three months. To increase the response rate, the student sent a second copy of the form to instructors who had not responded to the first. This was done during the first week of

September 1993. A modest return was received from the second mailing, and no replies came after the beginning of October.

Of the 274 faculty targeted, 174 surveys were returned, for a response rate of 64%. During October 1993, the student coded the survey forms using a Lotus spreadsheet which allowed for rapid sorting and comparisons. In late October, the results were analyzed and the written report completed by the middle of November 1993.

Data Analysis Techniques

Most of the results of the project are reported as percentages as a means of representing the opinions and practices of the faculty. However, two conditions should be noted regarding the outcomes. First, even though 174 surveys were returned, some were incomplete or had invalid responses, thus the useable base for a particular question might be fewer than 174. Second, because of rounding, some of the percentages reported might add up to more than 100.

Besides providing a profile of the general Sinclair faculty, this study also attempted to evaluate the variety within the College by comparing the responses of instructors from the various curricular disciplines. To do so, the faculty were divided into eight groups according to subjects taught. These divisions are displayed in Table 1, which shows the name of the discipline, the number of individuals within that group, the relationship of that group to the whole (expressed in percentages), and the departments

represented by that discipline. These divisions will be referred to throughout this project.

TABLE 1

SINCLAIR FACULTY GROUPED BY DISCIPLINE

Discipline	Persons	%	Departments represented
Arts	8	5	Applied Arts, Dance, Fine Arts, Music, Theatre
Business	16	9	Accounting, Economics, Legal Assisting, Management, Marketing, Real Estate
Engineering	19	11	Architecture, Automotive, Civil Construction, Drafting, Electrical and Electronics Repair, Electomechanical Engineering, Electronics Engineering, Fire Science, Industrial Engineering, Mechanical Engineering, Packaging, Quality Engineering, Safety Risk Management
Health	41	24	Allied Health, Dental Hygiene, Dietetics, Emergency Medical, Health Information, Medical Assistant, Mental Health, Nursing, Occupational Therapy, Physical Therapy, Radiology, Respiratory Care

TABLE 1 (CONTINUED)

SINCLAIR FACULTY GROUPED BY DISCIPLINE

Discipline	Persons	%	Departments represented
Human Services	26	15	Child and Family Education, Criminal Justice, Developmental Studies, Experience Based Education, Physical Education
Information	11	6	Computer Information Systems, Office Information Systems
Physical Sciences/ Mathematics	23	13	Biology, Chemistry, Geography, Geology, Mathematics, Physics
Social Sciences/ Humanities	30	17	Communications, English, Foreign Languages, Humanities, Psychology, Sociology

The number of faculty within each group varies considerably (for instance, instructors from the Health subjects outnumber their Engineering counterparts 2:1), thus when comparisons are made among disciplines, percentages are again used. As an example, if 10 Engineering and 10 Health faculty are engaged in an activity, this does not mean there is equity between those two groups. Instead, it indicates that over half of the instructors who teach Engineering subjects are involved (53%), but less

than a quarter of the Health faculty participate (24%), a significantly smaller segment.

A second technique is used to compare the activities of faculty from various disciplines. On certain questions, the survey asked instructors to mark all relevant items on a list (sources of technology training, for instance). An individual with a lot of experience may mark six types of training, while a novice could mark only one. If those two persons were considered as a group, they would have seven training activities between them, or an average of 3.50 for the group. This analysis was performed on several items in the study to find the average degree of activity within a discipline.

CHAPTER IV

RESULTS

Computer Experience

The first objective of this study was to determine the faculty's experience with computers and other educational technologies. To that end, instructors were asked to describe their access to computers, their computer experience and their preferences regarding computers.

Faculty were asked about their access to or ownership of personal computers both on campus and at home. It was revealed that the majority

of instructors had computers in their homes (77%), in their offices (62%) and in their classrooms or labs (62%).

When examined according to curricular area, faculty from Physical Sciences/Mathematics had the greatest access to computers at home (91%), followed by their colleagues in Health (85%) and Information (82%).

TABLE 2

ACCESS TO COMPUTERS AT HOME (BY DISCIPLINE)

Discipline	Yes		No	
	Persons	%	Persons	%
Physical Science/Mathematics	21	91	2	9
Health	35	85	6	15
Information	9	82	2	18
Social Science/Humanities	24	80	6	20
Engineering	15	79	4	21
Human Services	16	64	9	36
Business	9	56	7	44
Arts	4	50	4	50

In terms of computer access in the office, Business and Arts faculty led their colleagues (both with 100%), followed by Information (at 91%).

TABLE 3

ACCESS TO COMPUTERS IN OFFICE (BY DISCIPLINE)

Discipline	Yes		No	
	Persons	%	Persons	%
Business	16	100	0	0
Arts	8	100	0	0
Information	10	91	1	9
Engineering	16	84	3	16
Human Services	15	60	10	40
Health	24	59	17	41
Social Sciences/Humanities	24	59	17	41
Physical Sciences/Mathematics	4	50	4	50

In their classrooms or labs, the Information faculty had the greatest access to computers (100%). Engineering was next (89%) and then Arts (75%).

TABLE 4

ACCESS TO COMPUTERS IN CLASSROOM OR LAB (BY DISCIPLINE)

Discipline	Yes		No	
	Persons	%	Persons	%
Information	11	100	0	0
Engineering	16	89	2	11
Arts	6	75	2	25
Physical Sciences/Mathematics	16	73	6	27
Health	28	68	13	32
Human Services	11	46	13	54
Business	6	38	10	62
Social Sciences/ Humanities	10	34	19	66

To determine the types of computers that faculty members were using both at home and on campus, the questionnaire provided a list of eight different types of computers and instructors were asked to indicate the platforms they had access to. The final option on the list was a blank where individuals could write in a computer type which had not been included.

In their homes, most faculty owned an "IBM or compatible" computer (82%), followed by a computer from the "Apple II family" (13%) or the "Apple Macintosh family" (7%).

TABLE 5

TYPE OF COMPUTER AT HOME

Computer type	Persons	%
IBM or compatible	110	82
Apple II family	17	13
Apple Macintosh family	10	7
Radio Shack	6	4
Commodore 64 or 128	4	3
Other	2	1
Atari	1	1

Among the "Other" choices, one instructor wrote "TeleVideo" and another wrote "Xerox." Sixteen respondents indicated that they had more than one type of computer at home. All of the 16 had an "IBM or compatible," but 10 said they also had a computer from the "Apple II family" and 3 owned one of the "Apple Macintosh family."

In their offices, most faculty had an "IBM or compatible" computer (97%), followed by one of the "Apple Macintosh family" (3%) and some "Other" type (2%).

TABLE 6

TYPE OF COMPUTER IN OFFICE

Computer type	Persons	%
IBM or compatible	103	97
Apple Macintosh family	3	3
Other	2	2
Apple II family	1	1
Radio Shack	1	1

In the "Other" category, one individual listed "WYSE" and another wrote "Zenith." Four instructors indicated that they had more than one computer in their office. Among them, three had both an "IBM or compatible" and one of the "Apple II family." The fourth indicated a combination of "Radio Shack" and "Zenith."

In their classrooms or labs, the pattern was much the same. Ninety-three percent had an "IBM or compatible," while 28% had an "Apple II family" computer and 9% had an "Apple Macintosh family" computer.

TABLE 7

TYPE OF COMPUTER IN CLASSROM OR LAB

Computer type	Persons	%
IBM or compatible	92	93
Apple II family	28	28
Apple Macintosh family	9	9
Radio Shack	3	3
Commodore Amiga family	1	1
Commodore 64 or 128	1	1

Thirty instructors indicated that they had more than one type of computer in their classrooms or labs. All of the 30 had an "IBM or compatible," but 20 had in addition an "Apple II family" computer and 4 had one from the "Apple Macintosh family."

Next the survey sought to determine all of the types of computers the faculty have used in any setting. Of those who had used computers, nearly all had had some experience with an "IBM or compatible" (94%). Half had used one of the "Apple II family" and 30% had used a computer from the "Apple Macintosh family."

TABLE 8

COMPUTERS USED IN ANY SETTING

Computer type	Persons	%
IBM or compatible	150	94
Apple II family	80	50
Apple Macintosh family	47	30
Radio Shack	33	21
Commodore 64 or 128	20	13
Other	14	9
Atari	12	8
Commodore Amiga family	10	6

Of the 14 individuals who filled in the "Other" space, 6 did not specify a particular platform, 2 indicated experience with mainframes and the rest wrote in other brands (such as "Zenith", "Xerox" and "Texas Instruments"). More than half of the respondents indicated that they had

had experience with more than one type of computer. One person had used all of the types listed, while four people had used seven of the eight.

TABLE 9

MULTIPLE COMPUTERS USED

Number of Computer Types	Persons	%
Eight	1	1
Seven	4	2
Six	1	1
Five	5	3
Four	13	8
Three	24	14
Two	62	36
One	47	27
None	15	9

Analysis reveals that 15 respondents indicated no experience with any type of computer. Of the 47 instructors with exposure to only one type of computer, the overwhelming majority had had their sole experience with an "IBM or compatible" (43 persons), followed by "Other" (3 persons) and an "Apple Macintosh family" computer (1 person).

To find which academic discipline has had the most experience with a variety of computer types, a comparison was made that revealed the Art faculty have had the broadest experience with the most computer platforms (3.00 types per instructor). Second was Information (2.82) and third was Physical Sciences/Mathematics (2.48).

TABLE 10

MULTIPLE COMPUTERS USED (BY DISCIPLINE)

Discipline	Persons	Computer Types Used	Average Per Discipline
Art	8	24	3.00
Information	11	31	2.82
Physical Sciences/Mathematics	23	57	2.48
Engineering	19	45	2.37
Human Services	26	58	2.23
Health	41	79	1.93
Business	16	29	1.81
Social Sciences/Humanities	30	46	1.53

Finally, the survey sought to ascertain the preferred type of computer among Sinclair's faculty. The dominant choice was "IBM or compatible" with 80%, followed by computers from the "Apple Macintosh family" (12%) and the "Apple II family" (4%).

TABLE 11

TYPE OF COMPUTER PREFERRED

Computer type	Persons	%
IBM or compatible	111	80
Apple Macintosh family	16	12
Apple II family	6	4
Other	3	2
Commodore 64 or 128	1	1
Radio Shack	1	1

Among the three individuals who chose the "Other" category, two wrote in other brands (such as "Zenith") and one wrote "Vax, Unix."

Technology Training

The issue of training was dealt with in three parts by this study. First, faculty members were asked to describe their current level of comfort and facility with technology. Then they were asked to list the types of training they had already received from a variety of sources and

to describe the benefit of their training. Finally they were given the opportunity to tell what types of training functions they would like Sinclair to sponsor.

When asked about their comfort level working with computers and other technologies, 54% reported they were "Comfortable," 26% said they were "Very comfortable" and 20% described themselves as "Uncomfortable."

When analyzed according to subjects taught, those in Information were the most at ease with technology (73% described themselves as "Very comfortable"). Next came Engineering (37% were "Very comfortable") and Business (at 31%).

TABLE 12

COMFORT LEVEL WITH TECHNOLOGY (BY DISCIPLINE)

Discipline	Very Comfortable		Comfortable		Uncomfortable	
	Persons	%	Persons	%	Persons	%
Information	8	73	3	27	0	0
Engineering	7	37	10	53	2	11
Business	5	31	8	50	3	19
Physical Sciences/ Mathematics	6	26	15	65	2	7
Arts	2	25	5	63	1	13
Social Sciences/ Humanities	6	20	20	67	4	13
Human Services	4	17	14	58	6	25
Health	6	15	18	45	16	40

Fifty-nine percent of the faculty considered it "Easy" to learn to use new instructional technologies, while 25% thought it "Difficult" and 16% said it was "Very easy."

Examined by discipline, faculty in the Information fields again had the most positive responses regarding the ease with which they learn new

technologies (27% said it was "Very easy"). Their counterparts in Physical Sciences/Mathematics and Engineering came next (26% of both groups marked "Very easy").

TABLE 13

LEARNING NEW TECHNOLOGIES (BY DISCIPLINE)

Discipline	Very Easy		Easy		Difficult	
	Persons	%	Persons	%	Persons	%
Information	3	27	7	64	1	9
Physical Sciences/ Mathematics	6	26	15	65	2	9
Engineering	5	26	7	37	7	37
Art	2	25	3	38	3	38
Business	2	14	9	64	3	21
Human Services	3	13	13	54	8	33
Social Sciences/ Humanities	3	11	21	75	4	14
Health	3	8	23	58	14	35

To discover what types of training Sinclair's faculty have received, the questionnaire provided a list of eight potential sources and instructors were asked to mark all that they had been involved in. The final option on the list was a blank where individuals could write in a training experience which had not been included.

The most frequently chosen source of training was "Self-taught on the job" with an 85% response rate. Second was "Non-credit class(es) or workshop(s) at Sinclair" at 59%, followed by "Non-credit class(es) or workshop(s) elsewhere" with 34%.

TABLE 14

TECHNOLOGY TRAINING RECEIVED

Training Source	Persons	%
Self-taught on the job	148	85
Non-credit class(es) or workshops at Sinclair	102	59
Non-credit class(es) or workshops elsewhere	59	34
Credit class(es) at another undergraduate institution	37	21
Training from computer vendors	37	21
Credit class(es) at Sinclair	36	21
Other	22	13
Credit class(es) at a graduate instutution	10	6

Of the 22 instructors who marked the "Other" option, 10 indicated they received informal instruction from Sinclair colleagues (such as secretaries, technicians, other faculty, or the Help Desk). Seven others received help at home from friends, family or videocassette. Two had been trained at a previous job.

Many respondents indicated that they have received technology training from multiple sources. No one marked all eight options listed, but two individuals marked seven sources of training and seven people listed six sources.

TABLE 15

MULTIPLE SOURCES OF TRAINING

Number of Training Sources	Persons	%
Eight	0	0
Seven	2	1
Six	7	4
Five	10	6
Four	21	12
Three	45	26
Two	54	31
One	31	18
None	4	2

Analysis reveals that 4 faculty indicated no training from any source, while 31 said they had received only one type. Of those, 20 said the only instruction they had received was "Self-training on the job." Nine people had gotten their sole training experience from "Credit class(es) at Sinclair." The remaining two instructors with only one source of training had been to "Non-credit class(es) or workshop(s) elsewhere."

In an effort to determine the equity of training across the College, this analysis also examined the number of training sources received by the various disciplines. The Business faculty have had the greatest participation in technology training (3.56 sources per instructor), followed by Information (with 3.18 sources) and Engineering (3.05 sources).

TABLE 16

MULTIPLE SOURCES OF TRAINING (BY DISCIPLINE)

Discipline	Persons	Number of Sources	Average Per Discipline
Business	16	57	3.56
Information	11	35	3.18
Engineering	19	58	3.05
Arts	8	23	2.88
Physical Sciences/Mathematics	23	65	2.83
Health	41	108	2.63
Human Services	26	64	2.46
Social Sciences/Humanities	30	66	2.20

For the most part, faculty considered their training activities beneficial. Sixty-eight percent described their experiences as "Beneficial" and 38% said they were "Very beneficial." Eight percent characterized their training as "Not beneficial."

Faculty were then asked to detail the types of training they would like to see sponsored by Sinclair. The questionnaire provided a list of seven potential training activities and instructors were asked to mark all that appealed to them. The final option on the list was a blank where individuals could write in a training activity which had not been included.

The most popular choice was "Techniques for curriculum integration of technology" which was selected by 67% of respondents. Close behind at 66% came "Class presentations with new technologies (such as electronic interactivity or multimedia)." Third was "Demonstrations of new technologies" chosen by 58%.

TABLE 17

INTEREST IN TYPES OF TRAINING

Training Type	Persons	%
Techniques for curriculum integration of technology	113	67
Class presentations with new technologies	111	66
Demonstrations of new technologies	98	58
Design and production of instructional media	91	54
Basic computing skills for general tasks	80	48
A trade show with vendor displays	60	36
Other	14	8

Of the 14 persons who chose "Other," a variety of training options and general comments were written in. Three mentioned the need for reassigned time in order to take training. Two suggested that all they needed was access to the necessary hardware and materials and they would teach themselves: "Give me a computer and a manual in my office;" "Provide computer hardware to all faculty that request (then

assign liaisons/mentors)." Two pointed out the need for a supportive environment in addition to training events: "Financial support for those who make the effort;" "Need support/support/support for all of the above!" Two more requested exposure to practical examples of how to implement technology in instruction: "Examples applicable to classroom;" "Visit classes of professors who use this!" Finally, one pair of instructors seemed to have different needs and therefore made conflicting suggestions. One wrote, "Classes that skip the basic and get to the application," while a colleague asked for "Slow-paced training. Now non-credit workshops are *too* fast - do not learn anything of value."

Their interest in on-site training prompted some faculty members to mark more than one potential activity. Two people indicated interest in all seven options, while 21 others selected six choices.

TABLE 18

INTEREST IN MULTIPLE TYPES OF TRAINING

Number of Training Types	Persons	%
Seven	2	1
Six	21	13
Five	16	10
Four	32	19
Three	39	23
Two	32	19
One	19	11
None	6	4

Six faculty members did not indicate any desire for Sinclair-sponsored training activities, while 19 expressed interest in only one type. Of those, the most frequently requested training activity was "Basic computing skills for general tasks" (chosen by 5 instructors). Four persons indicated that their sole interest in training was "Techniques for curriculum integration of technology."

Next the faculty were asked what time of day they would like training to be available. Overall, 60% of respondents favored training during "Daytime." Twenty-three percent chose "Evening" and 17% selected "Weekend." One individual wrote in the comment that "Staff

development workshops always seem to conflict with classes and are always in the middle of the afternoon."

The survey then inquired whether faculty would prefer to have training events offered during the academic term or during quarter breaks. The prevailing choice was to hold training "During the quarter" (81%), though some preferred training "During quarter breaks" (19%).

Finally, the College instructors were asked how long they felt training sessions ought to last. Most of them favored training activities which last only "Part of a day" (67%), compared to "More than one day" (21%) or "A full day" (13%).

As with previous questions, some faculty wrote additional comments along with their responses. One instructor advocated training for part of a day, but "with a person available for questions after training, and practice, then another session." Another, who suggested training which lasts more than one day, advised it be "designed to go with typical Sinclair classes, such as MWF or TR." One other agreed that multiple-day training was necessary and commented, "A few hours each day over several weeks." Another simply stated, "However long it takes, not all at one time."

Technology Applications

One of the efforts of this study was to determine the ways that Sinclair faculty were currently utilizing information technology. They were asked about technology applications they used, both in the office and the

classroom, how often they used traditional audio-visual equipment, and whether they have developed their own media as opposed to relying on materials produced elsewhere.

To discover how faculty were using computers in their personal or administrative tasks, the questionnaire provided a list of seven potential applications and instructors were asked to mark all they were engaged in. The final option on the list was a blank where individuals could write in an application which had not been included.

The most frequently chosen personal or administrative task faculty used a computer to accomplish was "Document creation (such as word processing or desktop publishing)" with an 87% response rate. Second most popular was "Record keeping (such as spreadsheet or database records)" at 58%, followed by "Self-training (prepared tutorials or self-directed study)" with 43%.

TABLE 19

PERSONAL OR ADMINISTRATIVE COMPUTER TASKS

Type of Task	Persons	%
Document creation (word processing or DTP)	151	87
Record keeping (spreadsheet or database)	101	58
Self-training (prepared tutorials, self-directed study)	74	43
Entertainment (games or hobbies)	65	37
Telecommunications (data exchange between PCs)	59	34
Research (prepared databases or info services)	58	33
Other	16	9

Of the 16 instructors who marked the "Other" option, 7 mentioned using the calendar and electronic mail features of Sinclair's local area network. Six used a computer for some tasks unique to their discipline (like computer aided drafting, hospital reports and artwork). The remainder were involved in some type of development, such as programming or multimedia.

Many respondents indicated that they performed multiple personal or administrative tasks with a computer. One person marked all seven options, 13 others chose six and 17 people listed five tasks

TABLE 20

MULTIPLE PERSONAL OR ADMINISTRATIVE COMPUTER TASKS

Number of Tasks	Persons	%
Seven	1	1
Six	13	7
Five	17	10
Four	39	22
Three	36	21
Two	30	17
One	29	17
None	8	5

Analysis reveals that 8 faculty indicated they did not use a computer for any personal or administrative tasks, and 29 said they used a computer for only one task. Of those, 17 said the only task they performed was "Document creation," while 3 did "Record keeping" and 2 were involved in "Self-training."

In an effort to determine the equity of computer usage across the College, this analysis also examined the number of personal or

administrative tasks performed within the various disciplines. The Information faculty use a computer most frequently for personal or administrative tasks (3.72 applications per instructor), followed by Engineering (3.47 tasks) and Human Services (3.24).

TABLE 21

MULTIPLE PERSONAL OR ADMINISTRATIVE COMPUTER TASKS (BY DISCIPLINE)

Discipline	Persons	Number of Tasks	Average Per Discipline
Information	11	41	3.72
Engineering	19	66	3.47
Human Services	25	81	3.24
Business	16	51	3.19
Health	41	127	3.10
Physical Sciences/Mathematics	23	68	3.00
Social Sciences/Humanities	30	72	2.40
Arts	8	22	2.75

To discover how faculty were using computers in their instructional or classroom tasks, the questionnaire provided a list of seven potential applications and instructors were asked to mark all that they were

engaged in. The final option on the list was a blank where individuals could write in an application which had not been included.

The most frequently chosen instructional or classroom task faculty used a computer to accomplish was "Simulations or demonstrations" with a 41% response rate. Following that came "Presentation tool for lecture support" and "Tutorial or remedial skills training," both with 30%.

TABLE 22

INSTRUCTIONAL OR CLASSROOM COMPUTER TASKS

Type of Task	Persons	%
Simulations or demonstrations	71	41
Presentation tool for lecture support	53	30
Tutorial or remedial skills training	52	30
Research tool for individualized student work	29	17
Real-time experiments	22	13
Telecommunications	11	6
Other	7	4

Of the seven instructors who marked the "Other" option, five used a computer as part of homework assignments or tests. The remainder employed a computer for some task unique to their discipline (such as drafting or statistical data analysis).

Many respondents indicated that they performed multiple instructional or classroom tasks with a computer. No one marked all seven options, but one person chose six applications and one listed five.

TABLE 23

MULTIPLE INSTRUCTIONAL OR CLASSROOM COMPUTER TASKS

Number of Tasks	Persons	%
Seven	0	0
Six	1	1
Five	1	1
Four	11	6
Three	24	14
Two	42	24
One	58	33
None	34	20

Analysis reveals that a full 20% (34 persons) do not use a computer for any instructional or classroom tasks, and 58 instructors said they used a computer for only one teaching task. Of those, 22 said the only task they used a computer for was "Presentation tool for lecture support," 10 did "Tutorial or remedial skills training," and 9 performed "Simulations or demonstrations."

In an effort to determine the equity of computer usage across the College, this analysis also examined the number of instructional or classroom tasks performed within the various disciplines. The Engineering faculty use a computer most frequently for teaching tasks (2.26 applications per instructor), followed by Physical Science/Mathematics (2.21 tasks) and Information (2.09 tasks).

TABLE 24

MULTIPLE INSTRUCTIONAL OR CLASSROOM COMPUTER TASKS (BY DISCIPLINE)

Discipline	Persons	Number of Tasks	Average Per Discipline
Engineering	19	43	2.26
Physical Sciences/Mathematics	23	51	2.21
Information	11	23	2.09
Health	41	68	1.70
Business	16	23	1.44
Human Services	25	32	1.28
Arts	8	8	1.00
Social Sciences/Humanities	30	28	0.93

In order to evaluate the faculty's tendency to use traditional media in the classroom, the questionnaire asked them to rate how frequently they

employed eight different technologies. The most frequently utilized equipment was the "Overhead projector" with 58% of instructors indicating they used it "Very often." The "Computer" received the second greatest number of "Very often" replies (27%), followed closely by the "Videotape player" (with 25%).

TABLE 25

USE OF TRADITIONAL MEDIA IN THE CLASSROOM

Medium	Very often		Occasionally		Almost never	
	Persons	%	Persons	%	Persons	%
Overhead	99	58	45	26	26	15
Computer	45	27	57	35	63	38
Videotape player	42	25	99	59	27	16
Slides	17	10	59	34	96	56
Video camera	9	6	51	31	103	63
Audiotape	8	5	41	26	111	69
Film projector	4	2	30	19	128	79
TV or satellite	3	2	21	13	132	85

In addition to this result, which profiles the Sinclair faculty in general, a more detailed analysis can be derived by segmenting them into curricular groupings, as displayed in the following chart. Along the top row are listed the eight different media mentioned in the questionnaire. On the left column are the eight curricular disciplines. The values on the chart represent the percentage of faculty within the disciplines who said they used a particular medium "Very often."

By examining the columns from top to bottom, it can be determined which discipline uses a particular technology medium most frequently. For instance, the "Overhead projector" is used by Health faculty the most (80%), followed by Engineering (74%) and Human Services (60%). The same determination can be made for the remaining media.

By examining the rows from left to right, it can be determined which technology medium a particular discipline uses most frequently. For instance, the Arts faculty use the "Audiotape player" the most (57%), followed by the "Computer" (29%) and then three other media tied at 25%. The same determination can be made for the remaining disciplines.

Finally, by examining the occurrence of any values in a row will reveal how diverse the instructors' use of traditional media is within a particular discipline. For instance, while the Information faculty report heavy use of the "Computer" in their classes (73%), the "Overhead" is the only other medium which they use "Very often." On the other hand, faculty from Human Services report that to some degree they use every medium (except "Film projector") "Very often."

TABLE 26

TRADITIONAL MEDIA USED "VERY OFTEN" (BY DISCIPLINE)

Discipline	Overhead	Slides	VCR	Film	Cassette	PC	Camera	TV
Health	80	13	33	3	0	18	5	0
Business	56	13	6	7	0	47	7	0
Information	36	0	0	0	0	73	0	0
Engineering	74	22	33	6	0	42	6	0
Human Services	60	4	42	0	4	29	17	4
Arts	25	25	25	0	57	29	13	0
Physical Sciences/ Mathematics	52	13	7	0	0	9	0	0
Social Sciences/ Humanities	36	0	29	4	11	15	0	8

To discover what types of original media Sinclair's faculty have developed for their courses, the questionnaire provided a list of seven potential types and instructors were asked to mark all that applied. The final option on the list was a blank where individuals could write in a media type which had not been included.

Teachers developed "Printed handouts" the most; ninety-eight percent of faculty said they had created some for their classes. Second most popular were "Prepared transparencies" at 76%, followed by "Videotapes" with 46%.

TABLE 27

MEDIA DEVELOPED FOR COURSES

Type of media	Persons	%
Printed handouts	171	98
Prepared transparencies	133	76
Videotapes	81	47
Computer applications	67	39
Slide presentations	59	34
Audiotapes	38	22
Other	4	2

Of the four instructors who marked the "Other" category, two had created games, one had made posters and a fourth produced "radiographs."

Of the 67 instructors who marked "Computer applications," 18 created some type of assignment shell which served as homework or exercises for students to complete. The next most frequently created computer application was a simulation or demonstration (chosen by 16 persons), followed by tests and direct instruction (both selected by 6 instructors).

TABLE 28

COMPUTER APPLICATIONS DEVELOPED

Type of application	Persons
Assignment shells	18
Simulations	16
Tests	6
Direct instruction	6
Presentation images	5
Interactive media	3
Class review	2
Student drill	2
Student research	2
Software demonstrations	2
Telecommunications	1

Many respondents indicated that they had created original materials for more than one medium. No one marked all seven choices, but 12 instructors chose six media and 10 people listed five types developed.

TABLE 29

MULTIPLE TYPES OF MEDIA DEVELOPED

Number of Types	Persons	%
Seven	0	0
Six	12	7
Five	10	6
Four	44	25
Three	55	32
Two	42	24
One	8	5
None	3	2

Analysis reveals that three faculty indicated no original course materials developed in any medium, while eight said they had created only one type. Of those, all of them reported the only materials they had created were "Printed handouts."

In an effort to determine the equity of original media development across the College, this analysis also examined the number of original productions created by the various disciplines. The Engineering faculty

have had the greatest involvement with developing original media (4.11 types per instructor), followed by their colleagues in the Health fields (3.37 types) and Social Sciences/Humanities (3.17 types).

TABLE 30

MULTIPLE TYPES OF MEDIA DEVELOPED (BY DISCIPLINE)

Discipline	Persons	Number of Types	Average Per Discipline
Engineering	19	78	4.11
Health	41	138	3.37
Social Sciences/Humanities	30	95	3.17
Arts	8	25	3.13
Physical Sciences/Mathematics	23	71	3.09
Business	16	48	3.00
Information	11	31	2.82
Human Services	26	72	2.77

Finally, when asked to describe their experiences in using technology for instruction, the majority of College faculty said their efforts have been "Successful" (64%). Thirty-two percent felt they were "Very successful," and 4% said "Unsuccessful."

Obstacles to Technology Implementation

The study attempted to discover the obstacles that faculty encountered in their efforts to implement technology at Sinclair. The questionnaire provided a list of 13 potential obstacles and instructors were asked to rank the top 3. The final option on the list was a blank where individuals could write in an obstacle which had not been included.

By far, the most frequently cited hindrance was "Lack of time to explore, learn and use technology." Forty-six percent of instructors said it was the greatest obstacle, 22% said it was the second and 12% said it was the third. The second most frequently mentioned hindrance was "Lack of hands-on technical training in particular." While only 5% of faculty designated it their greatest hindrance, 16% said it was second and 26% placed it third. Next came "Lack of funds to purchase hardware and software" (15% named it first, 15% second and 9% third), and "Lack of guidance about media integration in general" (3% placed it first, 11% second and 14% third).

TABLE 31

OBSTACLES TO TECHNOLOGY IMPLEMENTATION

Obstacle	First (%)	Second (%)	Third (%)	Total (%)
Lack of time to explore, learn and use technology	46	22	12	27
Lack of hands-on technical training in particular	5	16	26	15
Lack of funds	15	15	9	13
Lack of guidance about media integration in general	3	11	14	9
Lack of information about available hardware and software	6	6	10	7
Lack of hardware	13	6	3	7
Inadequate rooms and facilities	5	5	7	6
Lack of software	4	8	4	5
Lack of encouragement or rewards from department or College	2	7	3	4
Lack of immediate assistance when troubleshooting is required	1	3	7	3
No perceived benefit to faculty	1	1	2	1
No perceived benefit to students	0	1	1	1
Other	1	0	1	1

Three faculty members used the "Other" option to include hindrances not listed. One said her greatest obstacle was "Intimidation." Another wrote his third obstacle was a "lack of understanding of technical matters on the part of other faculty." Finally, an instructor commented that his third hindrance was the "lack of department or College support. Everyone brags about 'High Tech SCC' but faculty can't even get CPUs in their offices. It's crazy!!!"

Technology Planning

This study asked a series of questions designed to determine whether the faculty's efforts with technology were guided by a plan at the personal, departmental or College level. The majority of the faculty did not perceive or possess a plan for technology at any of these three levels. Only 44% said they were aware of a plan for educational technology at Sinclair, and 43% said they were aware of a plan in their department. Forty-five percent indicated they had a personal plan for educational technology.

Commenting on Sinclair's efforts with educational technology, one faculty member said "Lots of 'talk' but no 'plan.'" Another remarked that he was unaware of a College plan, but "would like to know more about it."

When examined along curricular lines, a variety of awareness levels are revealed. In terms of an institutional plan for technology in instruction, Information instructors responded positively at a rate of 82%.

The next group was Human Services (58%) followed by Social Sciences/Humanities (55%).

TABLE 32

AWARENESS OF AN INSTITUTIONAL TECHNOLOGY PLAN

(BY DISCIPLINE)

Discipline	Aware		Unaware	
	Persons	%	Persons	%
Information	9	82	2	18
Human Services	14	58	10	42
Social Sciences/Humanities	16	55	13	45
Business	8	50	8	50
Health	16	40	24	60
Arts	3	38	5	63
Physical Sciences/Mathematics	6	26	17	74
Engineering	3	17	15	83

On the question of a plan for educational technology within their departments, the Arts faculty were the most positive (80%), followed by Business (63%) and Physical Sciences/Mathematics (57%).

TABLE 33

AWARENESS OF A DEPARTMENTAL TECHNOLOGY PLAN

(BY DISCIPLINE)

Discipline	Aware		Unaware	
	Persons	%	Persons	%
Arts	6	80	2	20
Business	10	63	6	38
Physical Sciences/Mathematics	13	57	10	43
Human Services	14	56	11	44
Information	5	45	6	55
Health	13	33	27	68
Social Sciences/Humanities	8	28	21	72
Engineering	4	22	14	78

One respondent commented about her department's plan: "We have it, but no time to prepare it."

When asked about their personal plans for integrating technology into instruction, the most positive responses came from the Business faculty (69%), then from Arts (63%) and Physical Sciences/Mathematics (57%).

TABLE 34

EXISTENCE OF A PERSONAL TECHNOLOGY PLAN

(BY DISCIPLINE)

Discipline	Yes		No	
	Persons	%	Persons	%
Business	11	69	5	31
Arts	5	63	3	38
Physical Sciences/Mathematics	13	57	10	43
Human Services	12	48	13	52
Health	17	44	22	56
Engineering	7	39	11	61
Information	4	36	7	64
Social Sciences/Humanities	7	23	23	77

The faculty were also asked how they would support the implementation of new instructional technologies at the College. The majority said they would be "Supportive" (51%). Forty-eight percent indicated they would be "Very supportive" and 1% were "Opposed."

When considered along curricular divisions, the question was most positively responded to by the Human Services faculty, among whom 68% said they would be "Very supportive." Second most positive were Information instructors (55%), followed by Arts (50%).

TABLE 35

SUPPORT FOR TECHNOLOGY IMPLEMENTATION

(BY DISCIPLINE)

Discipline	Very Supportive		Supportive		Opposed	
	Persons	%	Persons	%	Persons	%
Human Services	17	68	8	32	0	0
Information	6	55	5	45	0	0
Arts	4	50	4	50	0	0
Health	19	46	22	54	0	0
Physical Sciences/ Mathematics	10	43	13	57	0	0
Engineering	8	42	9	47	2	11
Social Sciences/ Humanities	12	41	17	59	0	0
Business	6	38	10	63	0	0

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The survey instrument produced a great deal of factual data about the Sinclair faculty's use of educational technology, but it requires some subjective consideration to bring relevance to the quantitative information. This project will also draw conclusions based upon the survey results and make recommendations designed to further encourage use of technology in instruction.

Computer Experience

Access to computers at home and on campus is high, and this holds true for most faculty regardless of curricular discipline. However, there are still many who do not have access to a computer at home, or in their offices or classrooms. Among those who do not have access to a computer, most wished that they did. Eighty percent want one at home, 91% want one in the office, and 73% desire a computer in their classrooms or labs. One individual wrote in a comment about how she might be able to get a computer for her home. She suggested, "How about College loaning me money interest free to buy computer with payback deducted from paycheck?"

It is obvious that the most widely used computer platform is the IBM or compatible, thus faculty training and software acquisition will need to continue in that direction. Still, Apple computers are used by many, so

awareness of that platform should be maintained (particularly after the discontinuation of the Apple IIe and the introduction of new integrated multimedia Macintosh machines).

Technology Training

Not surprisingly, the faculty who reported the greatest ease with technology were those who typically used computers in their occupations (Business and Information) and those involved in quantitative study (Engineering and Physical Sciences/Mathematics). Unfortunately, those who felt the least comfortable with technology (Social Sciences/ Humanities, Human Services and Health) were the least trained among the College faculty. There was a variety of skill levels reported among the faculty, which means that training opportunities should be made available for both the novice and experienced instructor.

There seems to be great promise for growth among the instructors. Relatively few of them thought it was difficult to learn new technologies, or felt uncomfortable using them. This is further evidenced by the fact that the most frequently mentioned source of technology training on campus was "Self-taught on the job."

Sinclair instructors' responses are consistent with reports in the Literature Review which revealed that little technology training is gained through formal credit classes. Most had taught themselves on the job (85%) or had received non-credit training at a Sinclair workshop (59%). In comparison, only 21% had received formal technology training through

classes at Sinclair or at another undergraduate institution; only 12% reported training from a graduate institution. This emphasizes the importance of continual inservice training which provides informal, non-credit activities on-site, designed to be current and relevant to the instructors.

As pointed out in the Literature Review, the number of training sources positively influences the results acheived. In Sinclair's case, most instructors have passed the "critical threshold" which tends to determine the impact of technology training carrying over into teaching. Eighty percent reported they have received training from two or more sources, increasing the likelihood that they will apply their training in class.

Finally, the overwhelmingly positive responses regarding potential Sinclair-sponsored training activities indicate that instructors are eager to become involved in more opportunities for growth. They are most interested in concrete, practical guidance about how to weave technology into their traditional methods of teaching. Their logistical preferences conform to existing staff development patterns (offering daytime training events which last a few hours and are held during the quarter). As future training events are structured, these recommendations from faculty should be considered.

Technology Applications

College faculty readily use computers for typical office tasks to simplify their workload; however, fewer instructors use computers in

actual instructional tasks. Their familiarity with word processing and record keeping, though, can be an opportunity to build through training the skills required to transfer technology applications to teaching.

This study conforms to previous research in terms of technology applications among disciplines. As noted in the Literature Review, faculty who teach quantitative subjects (such as math and science) were morelikely to use technology in teaching than those from disciplines such as art and humanities. At Sinclair, the Information, Engineering and Physical Sciences/Mathematics lead their colleagues in computer applications. Instructors from Social Sciences/Humanities and Arts are the least involved in using computers for classroom or office tasks. This demonstrates the need for support of certain disciplines to encourage training and the acquisition of courseware appropriate for these subjects.

Sinclair instructors use traditional media much the same as their counterparts surveyed in other studies. The most frequently used type of equipment is the overhead projector, followed by the computer and videotape player (closely following another survey mentioned in the Literature Review).

Many also choose to create their own materials, such as handouts, transparencies and videotapes. Only 39% have created computer applications, however, and the majority of those were simply traditional functions produced by a computer (such as tests, assignments and class review). While computers can indeed simplify the production of such media, emphasis should be placed on the use of computers to create

applications which utilize the unique advantages of technology (such as interactive multimedia, simulations and telecommunications). None of the eight disciplines dominated the others in terms of media developed, and most felt their efforts to utilize technology have been successful. This is a positive basis for further growth.

Obstacles to Technology Implementation

This study of Sinclair faculty is consistent with similar research done elsewhere as it pertains to potential hindrances to technological innovation. As discussed in the Literature Review, previous studies have established that the three most common obstacles are a shortage of funds, the scarcity of time to learn and utilize media, and the lack of training. Sinclair faculty report that their three greatest hindrances are the lack of time, training and funds. These issues are tied together with problems of computer access and training needs. Two respondents commented on one perpetual difficulty in acheiving success. Once they are out of the workshop room, many faculty lack the equipment to apply what they have learned. One wrote, "First you need money and equipment - then time, then training." A colleague added, "Without the hard and software, no need to take the training - couldn't use it."

Technology Planning

Perhaps the most disappointing discovery of this study was the lack of direction faculty felt as they sought to implement technology in

instruction. Most did not perceive of a plan for educational technology at Sinclair or in their departments, nor did they possess a personal plan themselves. As discussed earlier, it is crucial to the success of a technology initiative that faculty feel involved with and supported within a system that includes all organizational levels. Otherwise, they may doubt the validity of a plan, or their importance in it. Two faculty wrote comments revealing their reservations about Sinclair's technology effort. One said she would be "Very supportive," but only "if it's real and not more talk!" Another answered "Supportive," but added, "probably just another of those buzzwords."

Deans should engage the faculty's interest and inspire them to plan for technology. Departments ought to encourage instructors to pursue innovative projects. And the administration must provide support and access to help faculty reach their goals. Only when all levels of the institution are involved will technology proliferate throughout Sinclair.

APPENDIX A

REFERENCES

Bailey, Terry D. (1990). The Superintendent's Perception of the Benefit of Instructional Technology in Virginia School Divisions. Dissertation report, the Curry School of Education, University of Virginia.

Bruder, Isabelle. (1989, October). Ninth Annual Survey of the States. Electronic Learning, pp. 22-28.

College of DuPage. (1992). Institutional Plan for Computing, FY93-FY95, Executive Summary. Glen Ellyn, IL: Author.

Dede, Christopher J. (1990, January). Educators, Take Hold of the Future. Electronic Learning, pp. 8,9.

Greene, Benjamin B., Jr. (1991, July). A Survey of Computer Integration into College Courses. Educational Technology, pp. 37-47.

Hammond, Nick, et. al. (1992). Blocks to the Effective Use of Information Technology in Higher Education. Computers and Education, 18 (1-3), 155-162.

Janowiak, Robert M. (1990). Educational Technology in the Kindergarten through Twelfth Grades: A Study of Usage, Value and Needs. Chicago, IL: National Engineering Consortium.

Kent, P. F. & Linnegar, G. H. (1988). Integrating Computers into Accounting Education: A Survey of Australian Universities and Colleges. Accounting and Finance, 28 (1), pp. 81-91.

McAllister, Donald F. (1990). Developing a Self-Direct Computer Training Program for El Camino College Faculty. Major Applied Research Project, Nova University.

Nickerson, Raymond S. (1988). Technology in Education in 2020: Thinking About the Not-Distant Future. In Technology in Education: Looking Toward 2020 (pp. 1-9). Lawrence Erlbaum Associates, Inc.

Olson, Lynn. (1992, May). Use of Technology in Schools: Still Elusive. Education Digest, pp. 20-23.

Rogers, William A. & Hawkins, Robert Ross. (1991). Computer Education in Dental Laboratory Technology Programs. Journal of Dental Education, 55 (6), pp. 375-377.

Seppanen, Loretta. (1990). Washington Community College Faculty Development Survey Results: A Summary of the Results of All Full-Time Faculty. Olympia, WA: Washington State Board for Community College Education.

Steinhaus, Kurt A. (1991). Educational Technology: Kindergarten Through Twelfth Grade. Santa Fe, NM: New Mexico State Department of Education.

Teachers Speak Out on Technology in the Classroom. (1991, April). Instructor p. 71.

Washington, Wenifort. (1990). Beyond Computer Planning: Managing Educational Computer Innovations. (1990). Paper presented at the annual meeting of the Mid-Western Educational Research Association, Chicago, IL.

APPENDIX B

FACULTY TECHNOLOGY SURVEY

Professional Background

1. In which department do you teach? _____
2. How many years have you been a college instructor? _____
3. How many years have you taught at Sinclair? _____
4. How many classroom hours do you have in a typical quarter? _____

Computer Experience

Do you have a personal computer in your

5. home?	A. Yes	B. No
6. Sinclair office?	A. Yes	B. No
7. classroom or lab?	A. Yes	B. No

If you answered "No" to Questions 5, 6 or 7, would you *like* to have a computer in your

8. home?	A. Yes	B. No
9. Sinclair office?	A. Yes	B. No
10. classroom or lab?	A. Yes	B. No

Use the list below to answer Questions 11-15. Write the letter of your response in the space provided. If it is "Other", please write in the type of computer.

A. IBM or compatible	B. Apple Macintosh family
C. Apple II family	D. Commodore Amiga family
E. Commodore 64 or 128	F. Radio Shack
G. Atari	H. Other

If you answered "Yes" to Questions 5, 6 or 7, what type of computer do you have in your

11. home? _____
12. Sinclair office? _____
13. classroom or lab? _____
14. Which computers have you used? List all that apply. _____
15. Which computer do you prefer to use? _____

Technology Applications

16. What *personal or administrative* tasks do you perform with a computer? Circle all that apply.

    A. Record keeping (such as spreadsheet or database records)
    B. Document creation (such as word processing or desktop publishing)
    C. Research (exploring prepared databases or information services)
    D. Telecommunications (exchanging data between computers using a modem and phone line)
    E. Entertainment (games or hobbies)
    F. Self-training (prepared tutorials or self-directed study)
    G. Other _____

17. What *instructional or classroom* tasks do you perform with a computer? Circle all that apply.

    A. Tutorial or remedial skills training
    B. Presentation tool for lecture support
    C. Real-time experiments
    D. Simulations or demonstrations
    E. Telecommunications
    F. Research tool for individualized student work
    G. Other _____

Use the three choices below to indicate how frequently you use the following educational technologies in classroom instruction. Write the letter of your response in the space provided.

A. Very often B. Occasionally C. Almost never

18. Overhead projector _____ 19. Slide projector _____
20. Videotape player _____ 21. Film projector _____
22. Audiotape player _____ 23. Computer _____
24. Video camera _____ 25. TV or satellite _____

26. What type of media have you developed for your courses? Circle all that apply.

A. Printed handouts B. Prepared transparencies
C. Audiotapes D. Videotapes
E. Slide presentations F. Computer applications
G. Other _____

27. If you answered "Computer applications" on Question 26, please explain. _____

28. How would you describe your experiences utilizing technology in instruction?

A. Very successful B. Successful C. Unsuccessful

29. Rank the top three hindrances to utilizing new instructional technologies. Write a "1" in the space beside the greatest hindrance, a "2" by your second choice and a "3" by your third. Mark three only.

A. Lack of hardware _____
B. Lack of software _____
C. Lack of information about available hard and software _____
D. Lack of funds to purchase hardware and software _____
E. Inadequate rooms and facilities _____
F. Lack of time to explore, learn and use technology _____
G. Lack of guidance about media integration in general _____
H. Lack of hands-on technical training in particular _____

I. Lack of encouragement or rewards from your department or the College _____

J. Lack of immediate assistance when equipment troubleshooting is required _____

K. No perceived benefit to students _____

L. No perceived benefit to faculty _____

M. Other _____

Technology Training

30. What is your level of comfort working with computers and other technologies?

A. Very comfortable B. Comfortable C. Uncomfortable

31. How easy do you think it is to learn to use new instructional technologies?

A. Very easy B. Easy C. Difficult

32. What type of computer or technology training have you received? Circle all that apply.

A. Credit class(es) at Sinclair

B. Credit class(es) at another undergraduate institution

C. Credit class(es) at a graduate institution

D. Non-credit class(es) or workshop(s) at Sinclair

E. Non-credit class(es) or workshop(s) elsewhere

F. Training from computer vendors

G. Self-taught on the job

H. Other _____

33. How would you describe your training experiences?

A. Very beneficial B. Beneficial C. Not beneficial

34. What type of training would you like to see at Sinclair? Circle all that apply.

A. Basic computing skills for general tasks

B. Techniques for curriculum integration of technology

C. Design and production of instructional media (such as videos or computer applications)

D. Class presentations with new technologies (such as electronic interactivity or multimedia)

E. Demonstrations of new technologies

F. A trade show with vendor displays

G. Other _____

35. When would you like training to be available?

A. Daytime B. Evening C. Weekend

36. When would you prefer to attend training?

A. During the quarter B. During quarter breaks

37. How long would you like training to last?

A. Part of a day B. A full day C. More than one day

Sinclair Initiatives

38. Are you aware of a plan for educational technology at Sinclair?

A. Yes B. No

39. Are you aware of a plan for educational technology in your department?

A. Yes B. No

40. Do you have a personal plan for educational technology?

A. Yes B. No

41. How would you support the implementation of new instructional technologies at Sinclair?

A. Very supportive B. Supportive C. Opposed

One technology initiative being considered by the College is *multimedia*, the organized presentation of video, graphics, text, sound and animation by a computer. Programs created by instructors can be used as audio-visual tools to support class lectures, or viewed by students for individual study.

42. What is your level of familiarity with multimedia?

A. Very familiar B. Familiar C. Unfamiliar

43. Have you ever seen any multimedia demonstrations?

A. Yes B. No

44. Have you used a multimedia application created by someone else?

A. Yes B. No

45. Have you personally participated in creating a multimedia application?

A. Yes B. No

46. Can you envision the application of multimedia to your courses?

A. Yes B. No

47. If you answered "Yes" to Question 46, please explain: _____

_____

Another technology initiative is the *Applied Research Center for Teaching and Learning Strategies* (ARC), which will be a research center in Building 13 where faculty can explore innovative instructional technologies and develop lessons which utilize new media in the classroom.

48. What is your level of interest in participating in the ARC?

A. Very interested B. Interested C. Uninterested

49. What is your level of interest in utilizing reassigned time, sabbatical or other contractual arrangements to participate in the ARC?

A. Very interested B. Interested C. Uninterested

50. What innovative instructional strategies would you like to see explored at the ARC? These can be your own ideas, or applications that you've heard about from other schools or businesses. _____

_____

51. If you would like more information about these initiatives, please write your name here: _____

52. What topics regarding educational technology have not been included in this survey , but which you think are important? Use an additional page if necessary. _____

_____